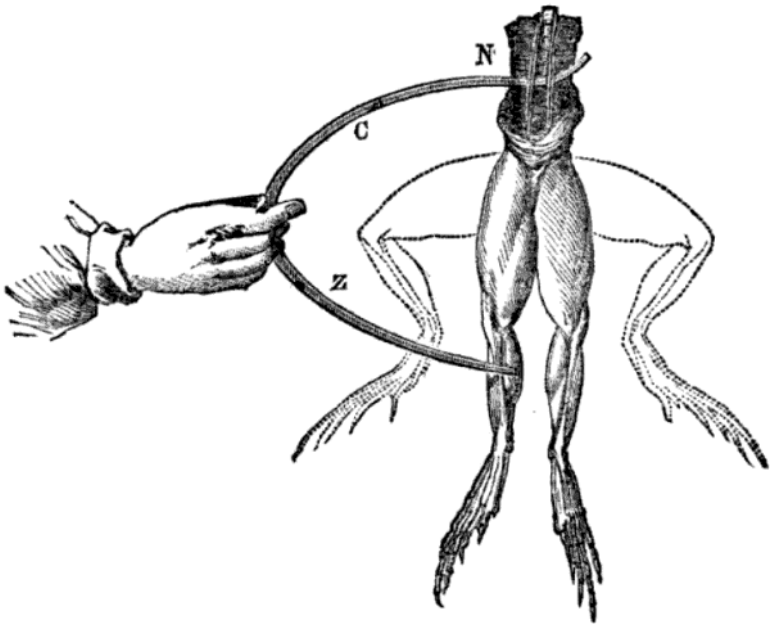
Electrochemical cells and current

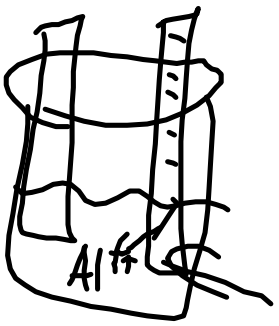
Galvani - late 1700s
dissected frogs - and found when an iron spike and copper spike touched frogs, the leg muscles would contract.
Thought he had discovered "the life force"



Volta - the observation was because of the metals reacting with the frog juice solution.

He put metals into various solutions and found an electric current was produced between the metals.

eg. Aluminum and carbon in a HCl solution



Aluminum goes into solution as Al^{3+} leaving e^- on the metal terminal.

there is a potential difference between the terminals, V = energy/charge in volts
1.0 V= 1.0 J/C

If you put a wire between the terminals, the electrons will move from one terminal to the other (negative to positive).

Current is defined as the amount of charge passing per unit time. Direction of current is the direction of positive charge movement (opposite the direction of electron flow - counter intuitive)

$I=q/t$ I is current in Ampère, 1.0 A = 1.0C/s
q is charge, in Coulombs, C
t is time is seconds, s.

eg. A current of 2.0 ampères is flowing through a wire. How many electrons pass a point in 2.0 minutes?

p477 Q1-9 odds
(we are skipping 18-4, 18-7)
https://www.youtube.com/watch?v=8KPz24Pqgz8

https://www.youtube.com/watch?v=yS7lKdas5D4

eg. A current of 2.0 ampères is flowing through a wire. How many electrons pass a point in 2.0 minutes?

$I = q/t$

$q = It = 2.0\ A \times 120\ s = 240C$

$240C\ (1e/1.602x10^{-19}C) =$
$240/(1.602x(10^{(-19)}))=1.498E21$

1.5×10^{21} electrons